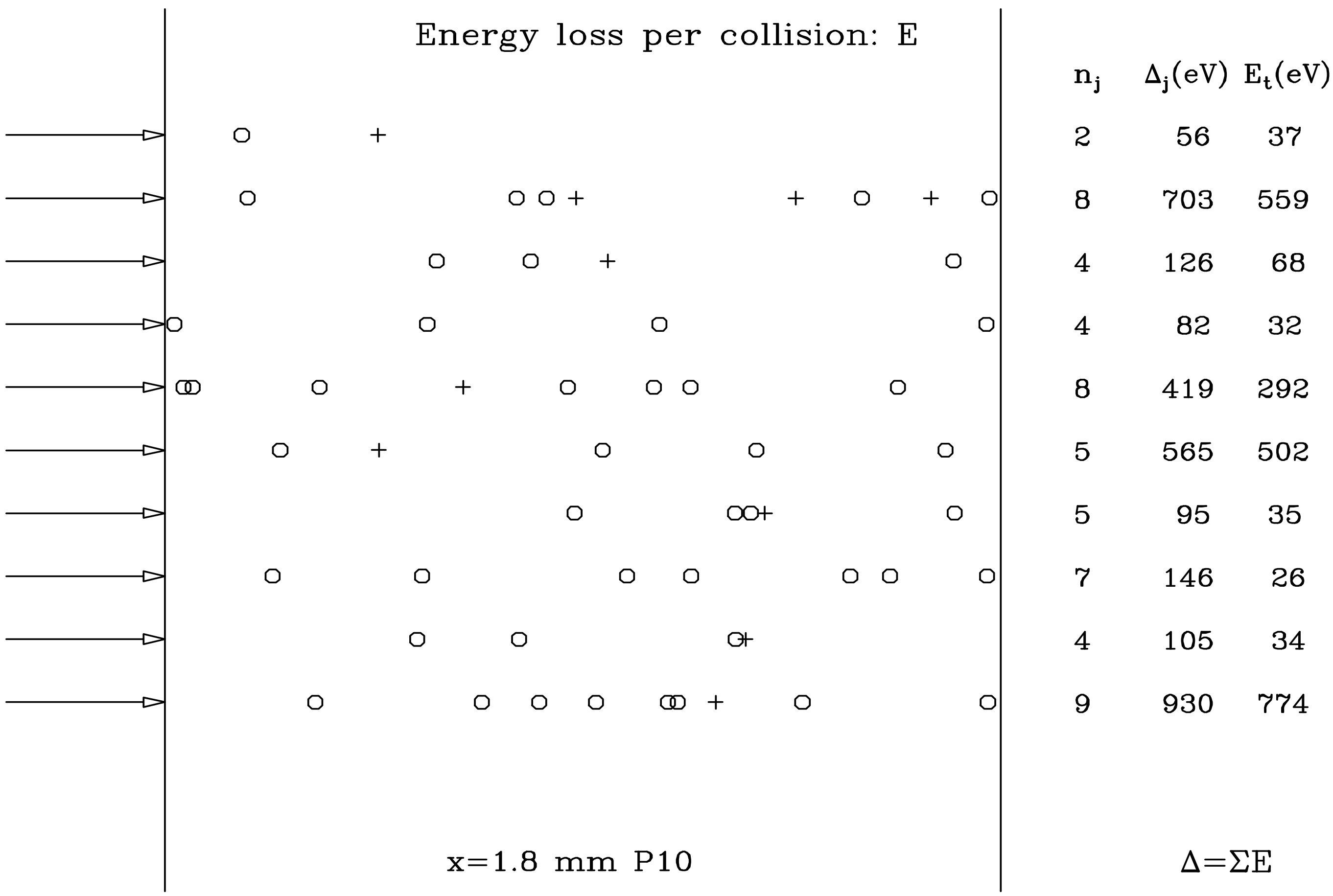


Figure 1: MC simulation of 10 particles with speed $\beta\gamma = 3.6$ traversing $x = 1.8$ mm of P10 gas.

$E < 30eV$: o $E > 30eV$: $+$

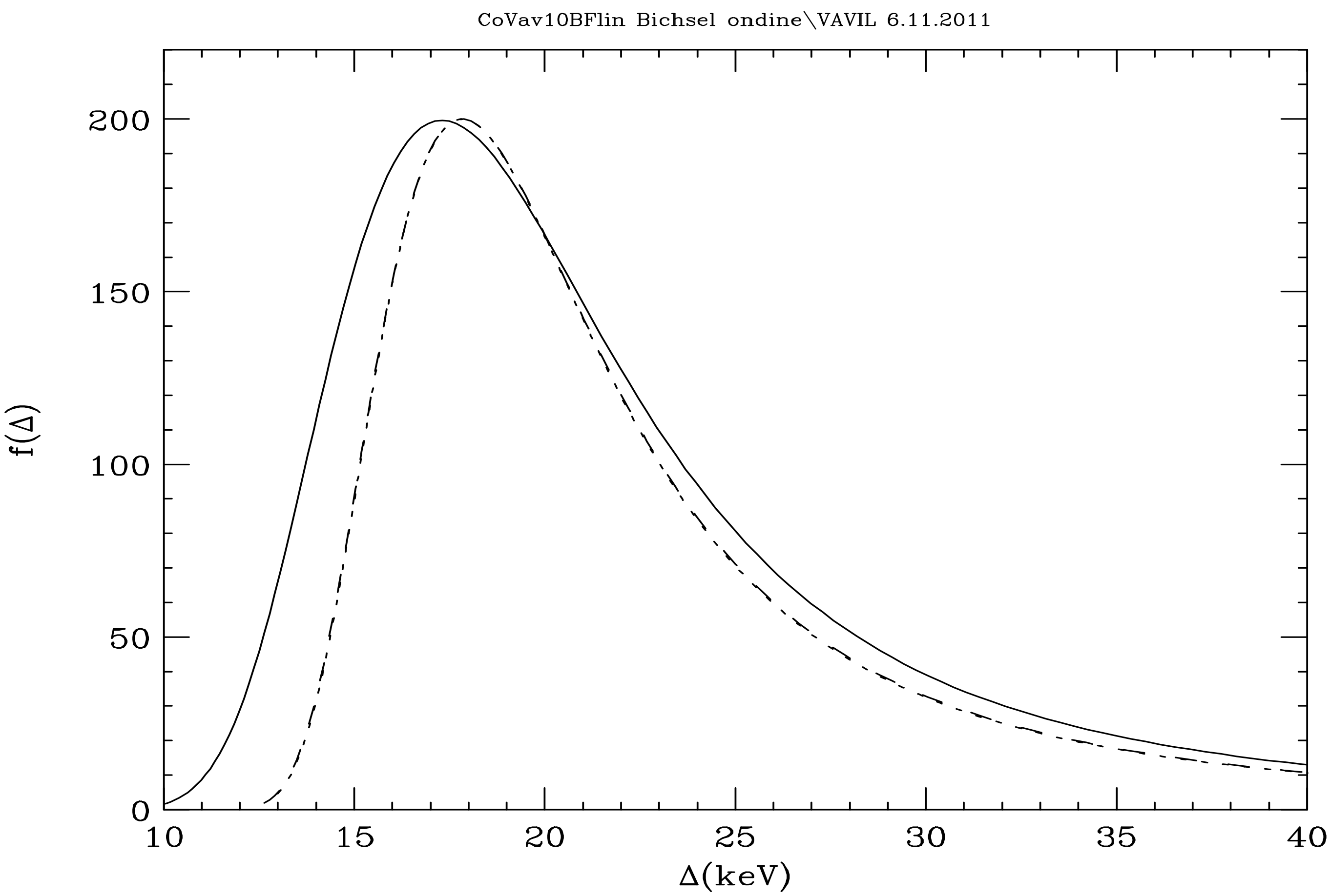


Figure 1: Calculations for protons with $\beta\gamma = 0.316$ traversing 10 μm of Si. Solid line: convolution with Bethe-Fano theory. Dashed line: convolution with Rutherford DCCS, dotted line: Laplace transform with Rutherford DCCS.

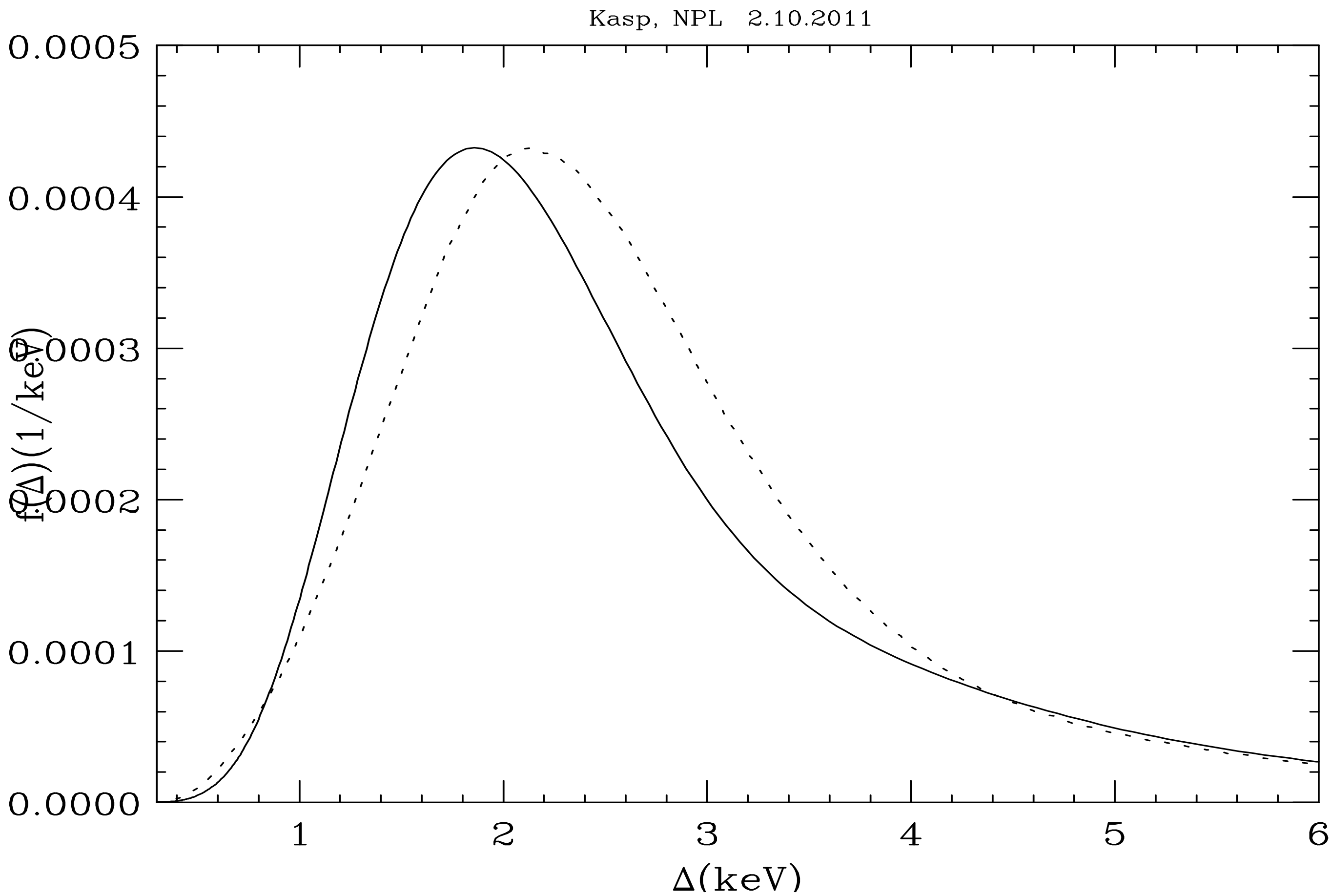


Figure 1: Calculations for protons with $\beta\gamma = 100$ traversing 10 μm of Si. Solid line: convolution with Bethe-Fano theory. Dashed line: GEANT4.

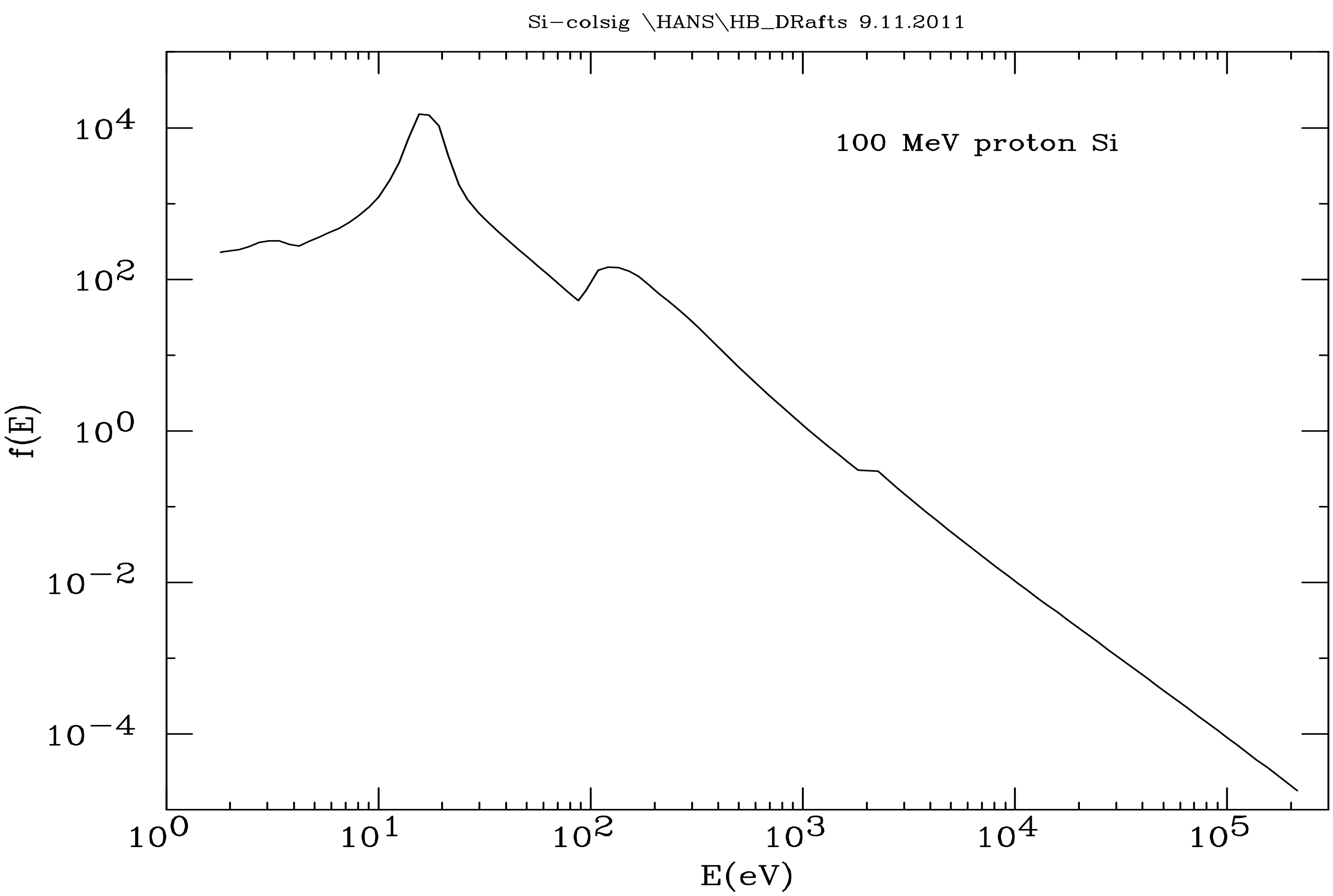


Figure 1: DCCS for 100 MeV protons traversing Si calculated with Bethe-Fano theory. $f(E)$ represents the DCCS in arbitray units.

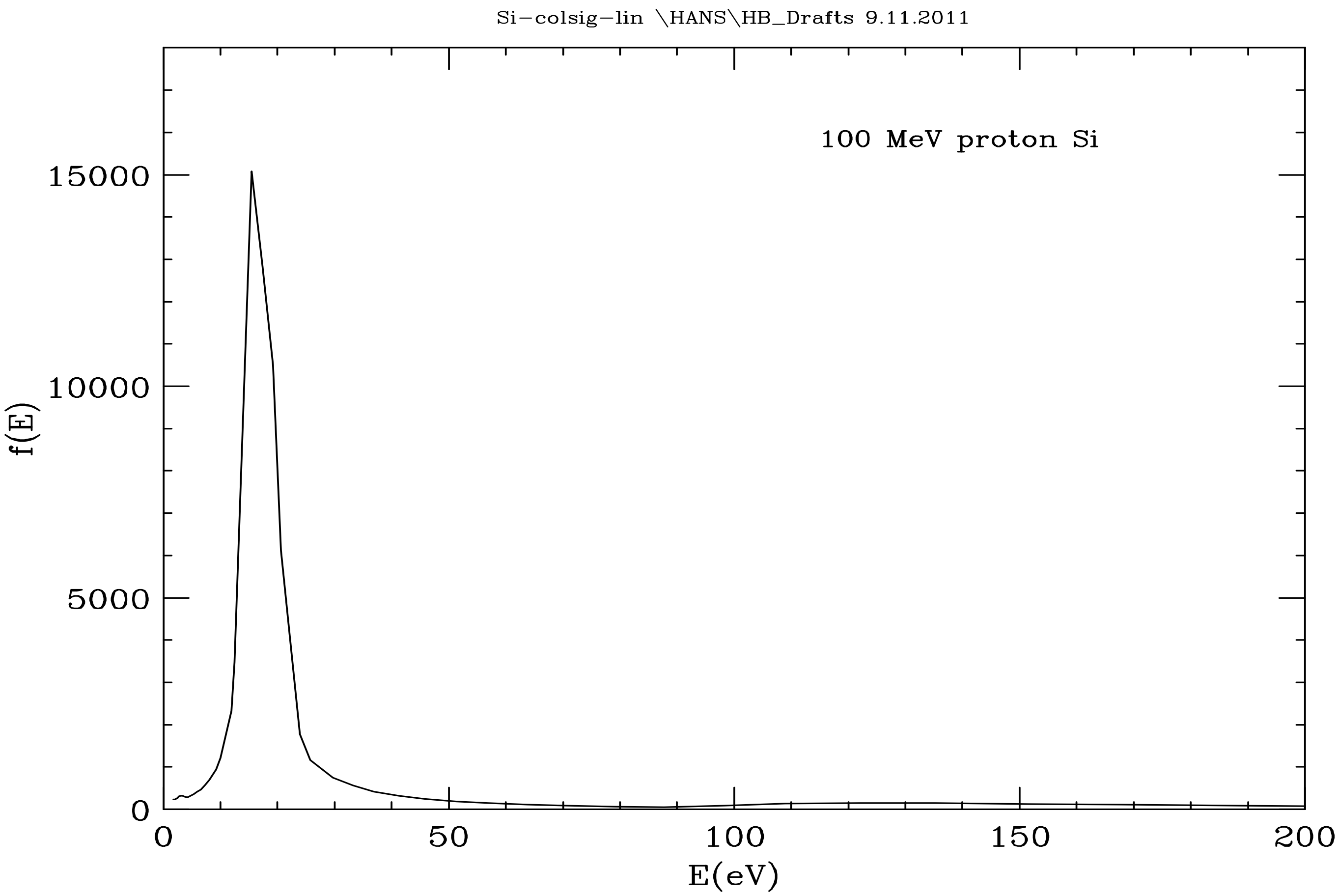


Figure 1: DCCS for 100 MeV protons traversing Si calculated with Bethe-Fano theory. $f(E)$ represents the DCCS in arbitray units.

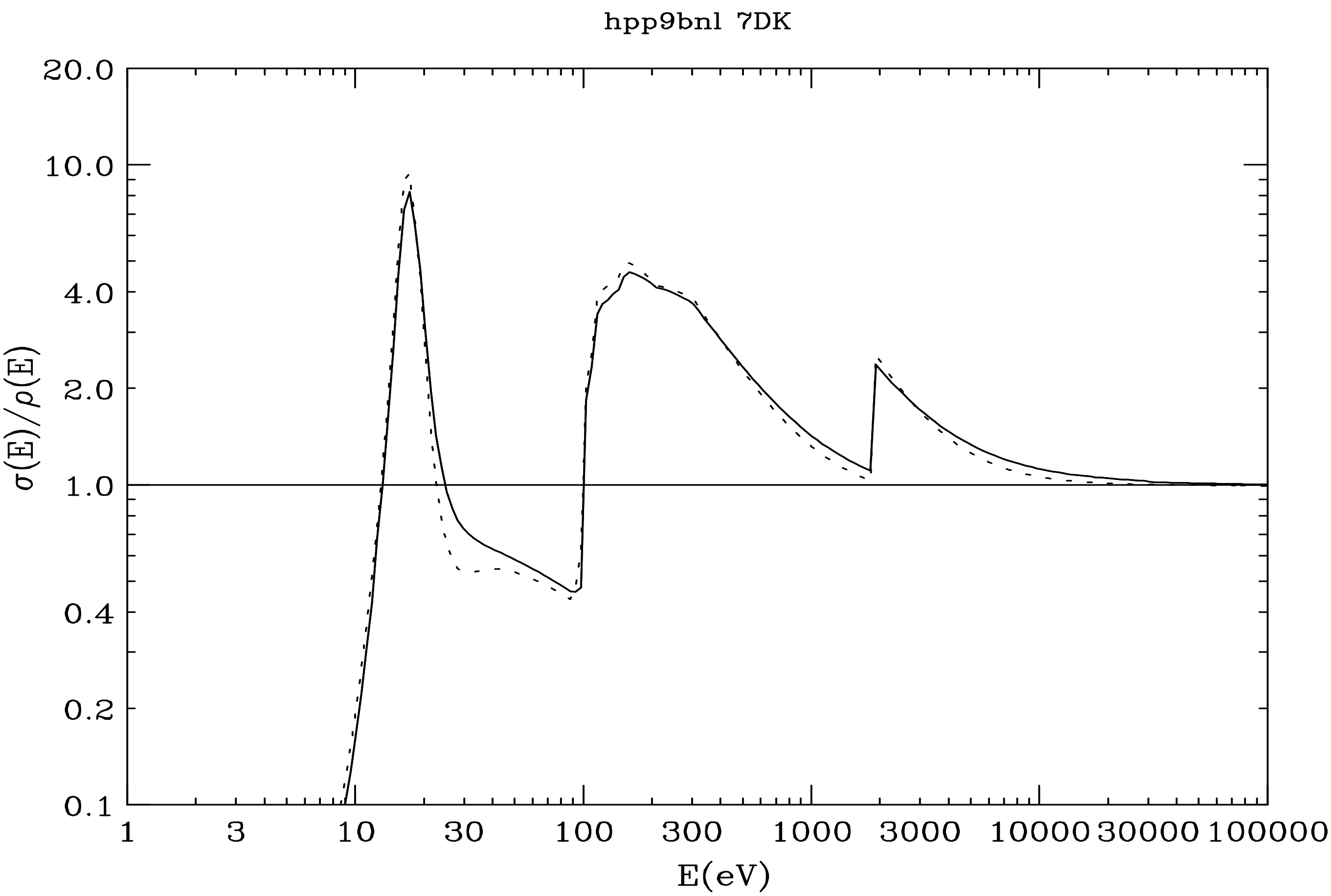
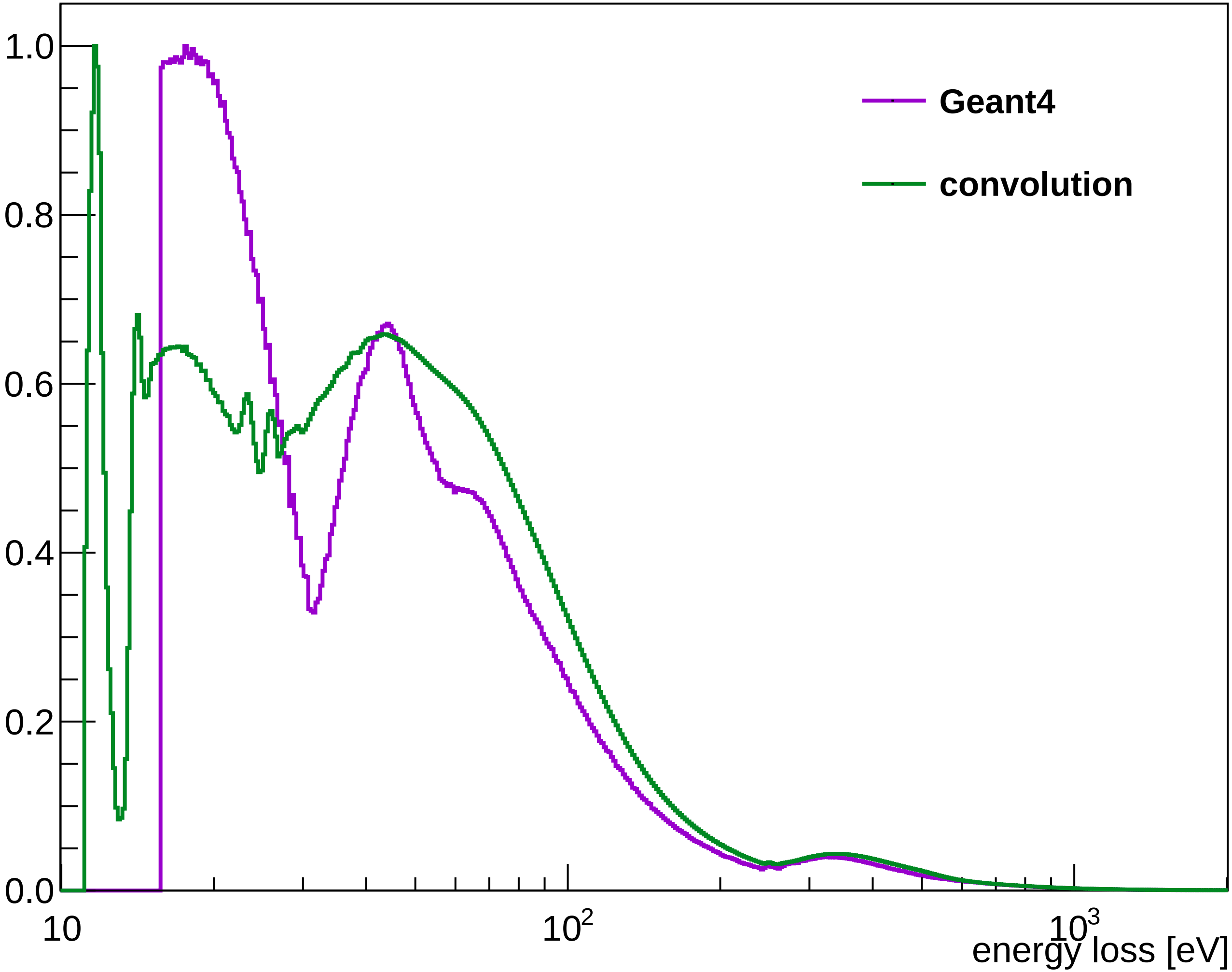
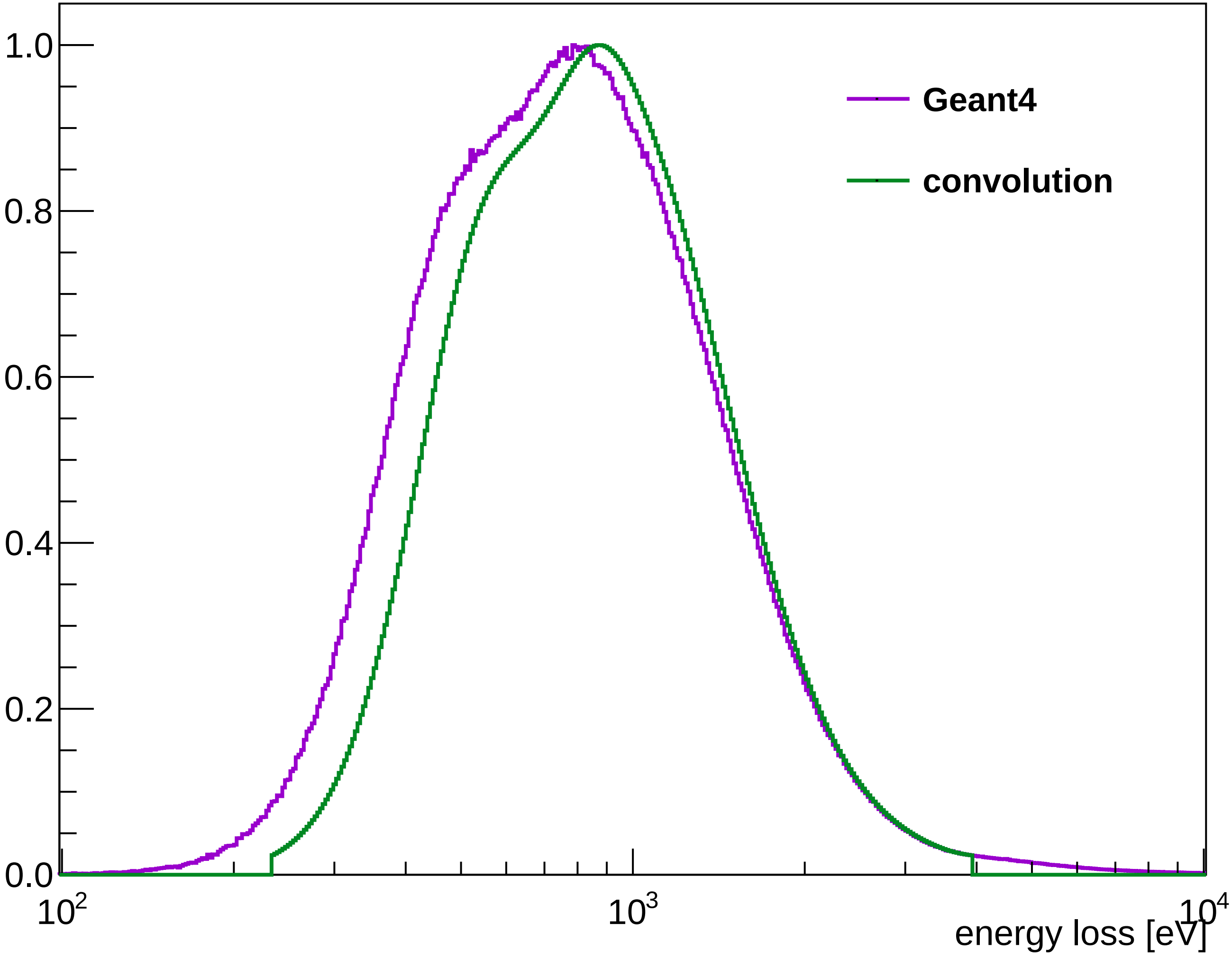


Figure 1: DCCS for 100 MeV protons traversing Si calculated with Bethe-Fano theory. $\sigma(E)$ represents the DCCS. The ratio $\sigma(E)/\rho(E)$ where $\rho(E)$ is the Rutherford DCCS, is given by the solid line. The same ratio for the FVP approximation is given by the dotted line.



Geant4
convolution
1.0
0.8
0.6
0.4
0.2
0.0
10
10^2
10^3
energy loss [eV]



Geant4
convolution
1.0
0.8
0.6
0.4
0.2
0.0
10^2
10^3
10^4
energy loss [eV]

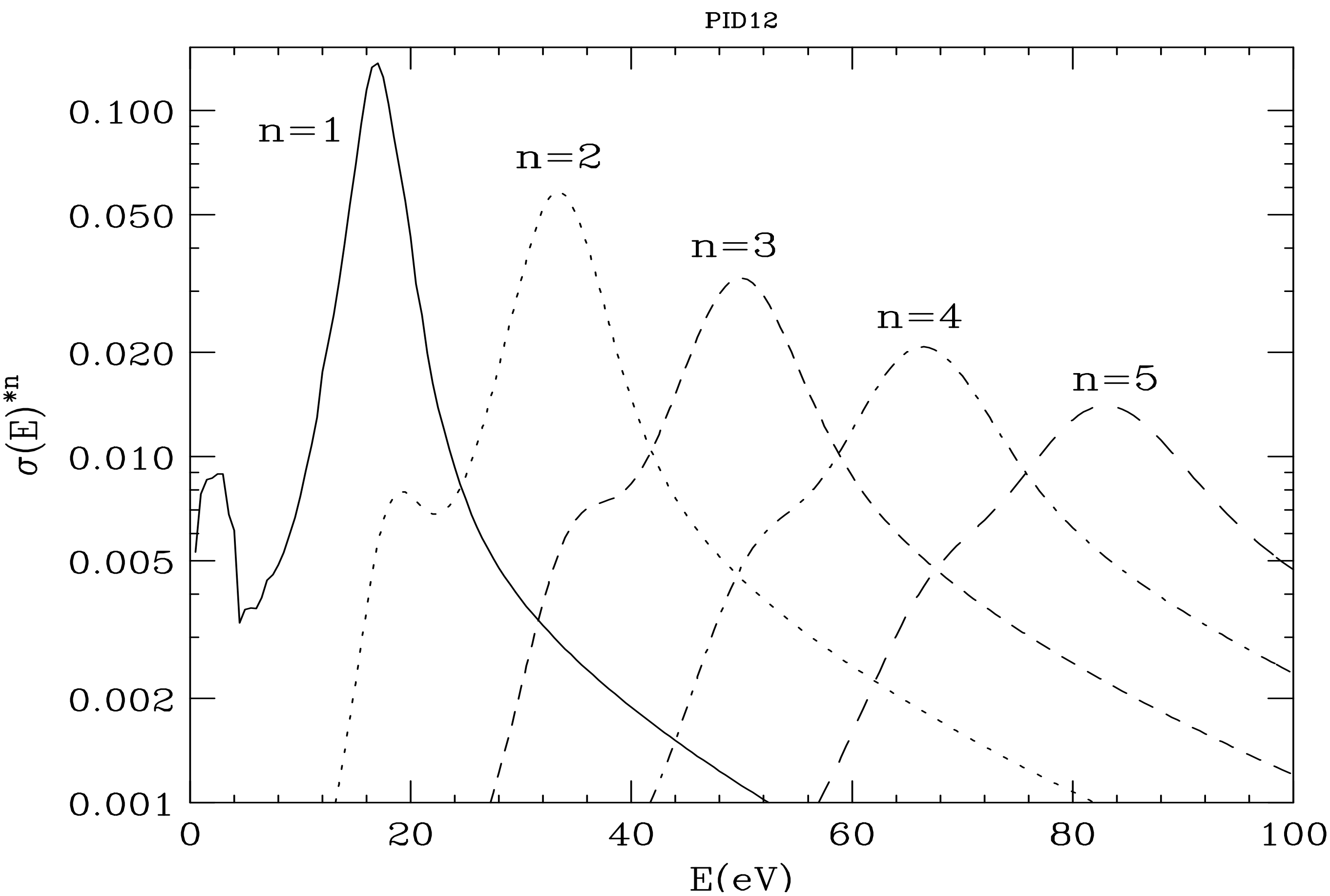


Figure 1: Convolutions $\sigma(E)^{*n}$ of Eq.(3) of the Bethe-Fano DCCS for particles traversing Si. $\sigma(E)$ represents the DCCS. The plasmon peak at 17 eV dominates.

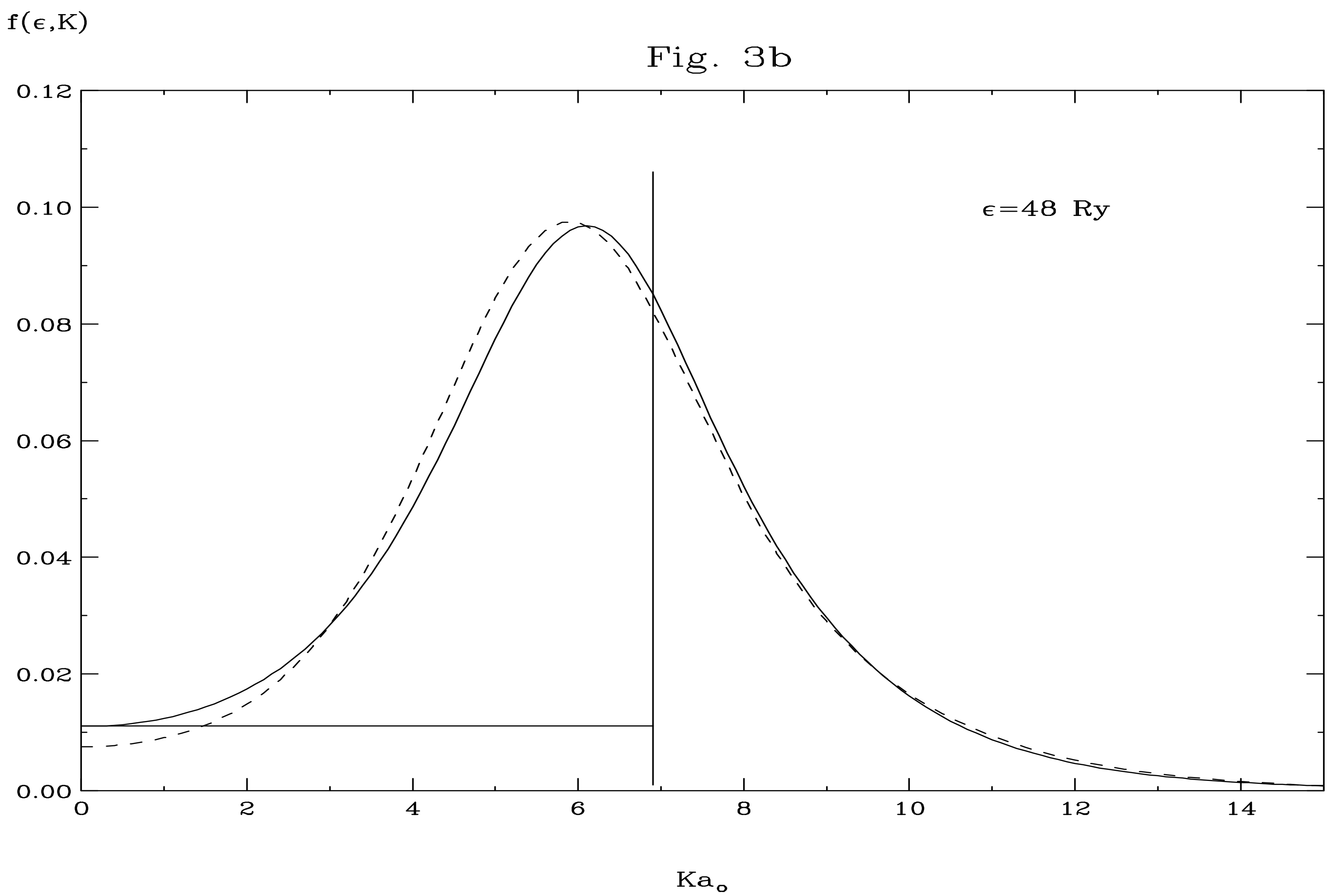


Figure 1: Generalized oscillator strength (GOS) $f(\epsilon, K)$ of the Bethe-Fano theory for the L-shell of Si. Solid line: detailed atomic structure, dashed line: hydrogenic approximation. The straight lines represent the FVP approximation.